

77 Rec'd PCT/PTO 22 OCT 2001

FORM PTO-1390 (Modified) (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 215140US0PCT	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 09/926367	
INTERNATIONAL APPLICATION NO. PCT/FR00/01051		INTERNATIONAL FILING DATE 20 APRIL 2000		PRIORITY DATE CLAIMED 22 APRIL 1999	
TITLE OF INVENTION TEXTURED SUBSTRATE CAPABLE OF FORMING A GLAZING, MTHOD FOR OBTAINING SAME					
APPLICANT(S) FOR DO/EO/US Christian MARZOLIN, et al.					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c) (2)) <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). 11. <input type="checkbox"/> A copy of the International Preliminary Examination Report (PCT/IPEA/409). 12. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210). <p>Items 13 to 20 below concern document(s) or information included:</p> <ol style="list-style-type: none"> 13. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input type="checkbox"/> A FIRST preliminary amendment. 16. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 17. <input type="checkbox"/> A substitute specification. 18. <input type="checkbox"/> A change of power of attorney and/or address letter. 19. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. 20. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 21. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 22. <input type="checkbox"/> Certificate of Mailing by Express Mail 23. <input checked="" type="checkbox"/> Other items or information: <p>Request for Consideration of Documents in International Search Report Notice of Priority / PCT/IB/304 / PCT/IB/308</p>					

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR <div style="font-size: 1.5em; font-weight: bold;">091 926367</div>		INTERNATIONAL APPLICATION NO. <div style="font-weight: bold;">PCT/FR00/01051</div>		ATTORNEY'S DOCKET NUMBER <div style="font-weight: bold;">215140US0PCT</div>	
--	--	---	--	--	--

24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <div style="display: flex; justify-content: space-between;"> <div style="width: 80%;"> <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) </div> <div style="width: 15%; text-align: right;"> <div style="font-weight: bold;">\$1040.00</div> <div style="font-weight: bold;">\$890.00</div> <div style="font-weight: bold;">\$740.00</div> <div style="font-weight: bold;">\$710.00</div> <div style="font-weight: bold;">\$100.00</div> </div> </div> <div style="text-align: right; font-weight: bold; margin-top: 10px;"> ENTER APPROPRIATE BASIC FEE AMOUNT = </div>				CALCULATIONS PTO USE ONLY	
				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				\$130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =	0	x \$18.00	\$0.00	
Independent claims	- 3 =	0	x \$84.00	\$0.00	
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$1,020.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0.00	
SUBTOTAL =				\$1,020.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				\$130.00	
TOTAL NATIONAL FEE =				\$1,150.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable) <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$1,150.00	
				Amount to be: refunded	\$
				charged	\$

a. ☒ A check in the amount of \$1,150.00 to cover the above fees is enclosed.


b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

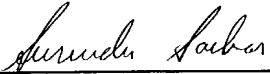
SEND ALL CORRESPONDENCE TO:



22850

Surinder Sachar
 Registration No. 34,423

(703) 413-3000



SIGNATURE

Norman F. Oblon

NAME

24,618

REGISTRATION NUMBER

Oct. 22 2001

DATE

Rec'd PCT/PTO 13 JUN 2002

215140US-0-PCT



IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
CHRISTIAN MARZOLIN ET AL : ATTN: APPLICATION DIVISION
SERIAL NO: 09/926,367 :
FILED: OCTOBER 22, 2001 :
FOR: TEXTURED SUBSTRATE :
CAPABLE OF CONSTITUTING A
GLAZING, PROCESS FOR THE
OBTAINING THEREOF

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination of the merits, please amend the above-identified application as follows.

IN THE TITLE

Please delete the title and replace with the following title:

TEXTURED SUBSTRATE CAPABLE OF FORMING A GLAZING, METHOD FOR
OBTAINING SAME

IN THE CLAIMS

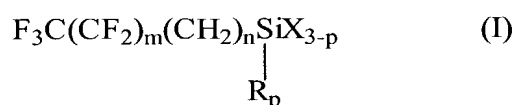
Please amend the claims as shown on the marked-up copy following this amendment to read as follows:

1. (Amended) A substrate comprising a relief, wherein said relief defines a low surface level and a high surface level said low surface level and said high surface level

separated by a height not less than 1/10 of the dimensions of a plurality of motifs forming said high level, said high surface level representing 1 to 65% of a surface of the substrate.

2. (Amended) The substrate according to claim 1, wherein said substrate is hydrophobic/oleophobic and further comprises an agent chosen from the group consisting of:

- a) silicones, and
- b) compounds corresponding to the formulas:



and



where $m = 0$ to 15;

$n = 1$ to 5;

$p = 0, 1$ or 2;

R is a linear or branched alkyl group or a hydrogen atom;

X is a hydrolyzable group such as a halogeno, alkoxy, acetoxy, acyloxy, amino, or a NCO group; and

$p' = 0, 1, 2$ or 3.

3. (Amended) The substrate according to claim 1, wherein said substrate is hydrophilic/oleophilic.

4. (Amended) The substrate according to claim 1, wherein said height ranges between 0.01 and 10 micrometers.

5. (Amended) The substrate according to claim 1, wherein a geometry of said relief does not display periodicity.

6. (Amended) The substrate according to claim 1, wherein a geometry of said relief displays a periodicity.

7. (Amended) The substrate according to claim 1, wherein said low surface level and said high surface level are connected to one another by means of at least one partition approximately perpendicular to a plane of the substrate.

8. (Amended) The substrate according to claim 1, wherein said high surface level displays a continuity in at least one direction of a plane of the substrate.

9. (Amended) The substrate according to claim 8, wherein said relief comprises a multiplicity of approximately identical parallelepipedal objects, said parallelepipedal objects parallel and uniformly spaced.

10. (Amended) The substrate according to claim 1, wherein said high surface level does not display continuity in any direction of a plane of the substrate.

11. (Amended) The substrate according to claim 1, wherein said relief comprises a multiplicity of approximately identical cylindrical craters uniformly distributed on the substrate, a multiplicity of axes of said craters approximately perpendicular to a plane of the substrate.

12. (Amended) The substrate according to claim 1, wherein said relief comprises a discrete series of identical or different objects.

13. (Amended) The substrate according to claim 12, wherein said discrete series of identical or different objects consists of a plurality of cylinders with axes approximately perpendicular to a plane of the substrate.

14. (Amended) The substrate according to claim 13, wherein said relief comprises a multiplicity of approximately identical cylinders of revolution uniformly distributed on the substrate.

15. (Amended) The substrate according to claim 1, wherein said relief is based on at least one compound of at least one of the elements selected from the group consisting of Si, W, Sb, Ti, Zr, Ta, V, Pb, Mg, Al, Mn, Co, Ni, Sn, Zn, In, a plastic and a plastic containing a filler, said compound optionally hardened by means of application of an energy source, or a thermoplastic, and wherein at least one underlying portion of the substrate is composed of a glass, a plastic or combination thereof.

16. (Amended) A substrate according to claim 1, wherein said substrate is a conductor of electricity.

17. (Amended) The substrate according to claim 1, wherein said substrate has anti-reflecting properties.

18. (Amended) The substrate according to claim 1, wherein said substrate has anti-staining properties.

19. (Amended) A process for formation of a substrate comprising a relief according to claim 1, said process comprising

- applying to a support surface a precursor of liquid to viscous consistency,
- molding a sol-gel from the precursor, then
- consolidating the precursor through evaporation of a solvent.

20. (Amended) A process for formation of a substrate comprising a relief according to claim 1, said process comprising

- applying to a support surface a polymerizable and/or cross-linkable plastic,
- performing polymerization, cross-linking or a combination thereof of said plastic,

and

- separating a residual component.

21. (Amended) A process for formation of a substrate comprising a relief according to claim 1, said process comprising

- forming a mask on a surface
- attacking a portion of said surface not protected by the mask, then
- optionally removing the mask.

22. (Amended) A process for formation of a substrate comprising a relief according to claim 1, said process comprising causing a film forming said relief to adhere to a support surface.

23. (Amended) The process according to claim 19, wherein a mold is formed, said mold capable of forming the substrate.

24. (Amended) The process according to claim 19, wherein the substrate is formed

25. (Amended) The process according to claim 19, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.

26. (Amended) The process according to claim 19, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

27. (Amended) A glazing comprising a substrate according to claim 1.

Please add the following new claims:

32. (New) The process according to claim 20, wherein a mold is formed, said mold capable of forming said substrate.

33. (New) The process according to claim 21, wherein a mold is formed, said mold capable of forming said substrate.

34. (New) The process according to claim 22, wherein a mold is formed, said mold capable of forming said substrate.

35. (New) The process according to claim 20, wherein the substrate is formed.
36. (New) The process according to claim 21, wherein the substrate is formed.
37. (New) The process according to claim 22, wherein the substrate is formed.
38. (New) The process according to claim 20, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
39. (New) The process according to claim 21, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
40. (New) The process according to claim 22, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
41. (New) The process according to claim 23, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
42. (New) The process according to claim 32, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
43. (New) The process according to claim 33, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
44. (New) The process according to claim 34, wherein a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.
45. (New) The process according to claim 20, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.
46. (New) The process according to claim 21, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.
47. (New) The process according to claim 22, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

48. (New) The process according to claim 23, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

49. (New) The process according to claim 32, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

50. (New) The process according to claim 33, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

51. (New) The process according to claim 34, further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

52. (New) The process as claimed in claim 19, wherein the precursor is consolidated with an energy source.

53. (New) The process as claimed in claim 20, wherein the plastic contains a filler.

54. (New) The process as claimed in claim 53, wherein the filler is a mineral filler.

55. (New) The process as claimed in claim 20, wherein said residual component is a solvent.

56. (New) The process as claimed in claim 20, wherein the precursor is consolidated with an energy source.

57. (New) The process as claimed in claim 21, wherein the mask is formed by a technique selected from the group consisting of serigraphy, ink-jet printing, lithography, and engraving.

58. (New) The process as claimed in claim 57, wherein the lithography is photolithography.

59. (New) The process as claimed in claim 58, wherein the engraving is ionic reactive engraving.

60. (New) The process as claimed in claim 21, wherein the surface is attacked by chemical means.

REMARKS

Claims 1-60 are active in the present application. Claims 1-26 have been amended to remove multiple dependencies or for clarity. Claims 32-60 are new claims. Support for the new claims is found in the original claims. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Norman F. Oblon

Norman F. Oblon
Attorney of Record
Registration No. 24,618

Daniel J. Pereira, Ph.D.
Registration No. 45,518

Daniel J. Pereira
Registration No. 45,518



22850

(703) 413-3000
Fax #: (703) 413-2220
DJPER/kst

I:\atty\SUKOS\2001\november\215140us-pr.wpd

215140US-0PCT

Marked-Up Copy
Serial No: <u>09/926.367</u>
Amendment Filed on: <u>6-13-2002</u>

IN THE TITLE

Please delete the title and replace with the following title:

[TEXTURED SUBSTRATE CAPABLE OF CONSTITUTING A GLAZING, PROCESS
FOR THE OBTAINING THEREOF]

--TEXTURED SUBSTRATE CAPABLE OF FORMING A GLAZING, METHOD
FOR OBTAINING SAME--

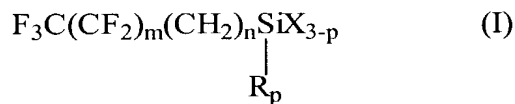
IN THE CLAIMS

Please amend the claims as follows:

--1. (Amended) A substrate comprising a relief, [which] wherein said relief defines a low surface level and a high surface level[,], said low surface level and said high surface level separated by a [certain] height not less than 1/10 of the [characteristic] dimensions of [the] a plurality of motifs forming said high level, [the latter] said high surface level representing 1 to 65% of [the] a surface of the substrate.

2. (Amended) [A] The substrate according to claim 1, wherein [characterized in that it] said substrate is hydrophobic/ oleophobic [by the fact that it comprises] and further comprises an agent chosen from [among] the group [made up] consisting of:

- a) [the] silicones, and
- b) [the] compounds corresponding to the formulas:



and



where

[-] $m = 0$ to 15 ;

[-] $n = 1$ to 5 ;

[-] $p = 0, 1$ or 2 ;

[-] R is a linear or branched alkyl group or a hydrogen atom;

[-] X is a hydrolyzable group such as a halogeno, alkoxy, acetoxy, acyloxy, amino, or
a NCO group; and

[-] $p' = 0, 1, 2$ or 3 .

3. (Amended) [A] The substrate according to claim 1, [characterized in that it]
wherein said substrate is hydrophilic/oleophilic.

4. (Amended) [A] The substrate according to claim 1, wherein [claims 1 to 3,
characterized in that] said height ranges between 0.01 and 10 micrometers.

5. (Amended) [A] The substrate according to claim 1, wherein [claims 1 to 4,
characterized in that the] a geometry of said relief does not display [any] periodicity.

6. (Amended) [A] The substrate according to claim 1, wherein [claims 1 to 4,
characterized in that the] a geometry of said relief displays a periodicity.

7. (Amended) [A] The substrate according to claim 1, wherein [claims 1 to 6,
characterized in that] said low surface level and said high surface level[s] are connected to
one another by means of at least one partition [partitions] approximately perpendicular to
[the] a plane of the substrate.

8. (Amended) [A] The substrate according to claim 1, wherein [claims 1 to 7, characterized in that] said high surface level displays a continuity in at least one direction of [the] plane of the substrate.

9. (Amended) [A] The substrate according to claim 8, wherein [characterized in that] said relief comprises a multiplicity of approximately identical parallelepipedal objects, said parallelepipedal objects parallel and uniformly spaced.

10. (Amended) [A] The substrate according to claim 1, wherein [claims 1 to 7, characterized in that] said high surface level does not display continuity in any [of the directions] direction of [the] a plane of the substrate.

11. (Amended) [A] The substrate according to claim 1, wherein [one of the preceding claims, characterized in that] said relief comprises a multiplicity of approximately identical cylindrical craters uniformly distributed on the substrate, [their axes being] a multiplicity of axes of said craters approximately perpendicular to [the] a plane of the substrate.

12. (Amended) [A] The substrate according to claim 1, wherein [one of the preceding claims, characterized in that] said relief comprises a discrete series of identical or different objects.

13. (Amended) [A] The substrate according to claim 12, wherein [characterized in that said objects consist of cylinders] said discrete series of identical or different objects consists of a plurality of cylinders with axes approximately perpendicular to [the] a plane of the substrate.

14. (Amended) [A] The substrate according to claim 13, wherein [characterized in that] said relief comprises a multiplicity of approximately identical cylinders of revolution uniformly distributed on the substrate.

15. (Amended) [A] The substrate according to claim 1, wherein [one of the preceding claims, characterized in that] said relief is based on at least one compound of at least one of the elements[:] selected from the group consisting of Si, W, Sb, Ti, Zr, Ta, V, Pb, Mg, Al, Mn, Co, Ni, Sn, Zn, In, [and/or] a plastic[, possibly] and a plastic containing a filler, [which may be] said compound optionally hardened by means of application of an energy source, or a thermoplastic, and [in that at] wherein at least one underlying portion of the substrate is composed of a glass, [and/or] a plastic or combination thereof.

16. (Amended) A substrate according to claim 1, wherein [one of the preceding claims, characterized in that it] said substrate is a conductor of electricity.

17. (Amended) [A] The substrate according to claim 1, wherein [one of the preceding claims, characterized in that it displays] said substrate has anti-reflecting properties.

18. (Amended) [A] The substrate according to claim 1, wherein [one of the preceding claims, characterized in that it displays] said substrate has anti-staining properties.

19. (Amended) A process for formation of a substrate comprising a relief according to claim 1, [one of the preceding claims, characterized in that it is composed of the stages consisting in:] said process comprising

- applying to a support surface a precursor of liquid to viscous consistency, [in]
- [carrying out the] molding [of] a sol-gel from [this] the precursor, then [in]
- consolidating [this] the precursor through evaporation of a solvent [, possibly with the aid of an energy source].

20. (Amended) A process for formation of a substrate comprising a relief according to claim 1, [one of the preceding claims, characterized in that it is composed of the stages consisting in:] said process comprising

- applying to a support surface a polymerizable and/or cross-linkable plastic [possibly containing fillers, in particular mineral fillers for reinforcement, in],
- performing polymerization, cross-linking, or a combination thereof of said plastic,
and
- separating [as well as separation of possible] a residual component [such as solvent, possibly with the aid of an energy source].

21. (Amended) A process for formation of a substrate comprising a relief according to claim 1, [one of claims 1 to 18, characterized in that, it is composed of the stages consisting in:] said process comprising

- forming a mask on a surface [according to a technique such as serigraphy, ink-jet printing, lithography, in particular photolithography, engraving, for example ionic reactive, or similar,]
- attacking[, in particular by chemical means, the portions] a portion of said surface not protected by [this] the mask, then [possibly in]
- optionally removing the mask.

22. (Amended) A process for formation of a substrate comprising a relief according to [one of claims 1 to 18, characterized in that it includes a stage consisting in] claim 1, said process comprising causing a film [in itself] forming said relief to adhere to a support surface.

23. (Amended) [A] The process according to claim 19, wherein [one of claims 19 to 22, characterized in that the claimed stages result in the formation of] a mold is formed, said mold capable of forming the substrate [which may be used to form said substrate].

24. (Amended) [A] The process according to claim 19, wherein [one of claims 19 to 22, characterized in that the claimed stages result in the formation of] the substrate [itself] is formed

25. (Amended) [A] The process according to claim 19, wherein [one of claims 19 to 24, characterized in that] a hydrophobic/oleophobic or hydrophilic/oleophilic agent is incorporated into said substrate comprising a relief.

26. (Amended) [A] The process according to claim 19, [one of claims 19 to 24, characterized in that it comprises a stage consisting in] further comprising forming a hydrophobic/oleophobic or hydrophilic/oleophilic coating on said relief.

27. (Amended) A glazing [made up, at least in part, of] comprising a substrate according to claim 1 [one of claims 1 to 18].--

Claims 32-60. (New).

09/926367

Rec'd PCT/PTO 13 JUN 2002

PCT/FR00/01051

WO 00/64829

**TEXTURED SUBSTRATE CAPABLE OF CONSTITUTING A
GLAZING, PROCESS FOR THE OBTAINING THEREOF**

This invention relates to a textured substrate, that is, one displaying a distinctive relief enabling it to achieve advantageous properties, in particular in the case of a transparent substrate and/or a substrate for which a certain optical quality is sought. These properties reside, among others, in the changing of the behavior of the substrate in wettability into a behavior which may be described as super-hydrophobic/oleophobic or super-hydrophilic/oleophilic, in anti-staining or anti-reflecting properties.

The property of hydrophoby/oleophoby of a substrate consists in that the angles of contact between a liquid and this substrate are large, for example on the order of 120° for water. The liquid then has a tendency to flow easily on the substrate in the form of drops, through simple gravity if the substrate is inclined or under the effect of aerodynamic forces in the case of a vehicle in motion. This phenomenon is the expression of an anti-rain effect. Moreover, the drops are capable of conveying along in their flow dust, insects or more or less greasy dirt of any nature, the presence of which might result in an unsightly appearance or even, as the case may be, an impairment of visibility through the substrate when the latter is transparent. To this extent, the hydrophobic/oleophobic substrate also has an anti-staining property.

Known hydrophobic/oleophobic agents are, for example, fluoruous alkylsilanes such as described in patent application EP-A1-0 675 087. They are applied in solution in known manner in accordance with conventional methods of deposition with or without heating.

On the contrary, the hydrophilic/oleophilic property of a substrate is manifested by small angles of contact between a liquid and this substrate, on the order of 5° for water on clean glass. This property promotes the formation of thin transparent liquid films, to the detriment of formation of condensation, or of frost made up of minuscule droplets degrading visibility through a transparent substrate. These anti-condensation effects and anti-frost effects seen on a hydrophilic/oleophilic substrate are well known.

Numerous hydrophilic, in particular hydroxylated, agents such as poly(hydroxyalkyl(meth)acrylates) are used for this purpose, in known manner, for transparent substrates). Certain compounds, known as photocatalytic, such as TiO_2 , likewise are used, in particular in combination with glass substrates, not only for their hydrophilic nature following exposure to light, but also for their ability to break down dirt of organic origin by means of a process of radical oxidation; the hydrophilic/oleophilic and anti-staining properties then are achieved simultaneously. It is known to deposit coatings with a photocatalytic property comprising TiO_2 from at least one titanium precursor, if need be in solution, through liquid-phase pyrolysis, through a sol-gel technique or even through vapor-phase pyrolysis.

In accordance with the foregoing, the hydrophobic/oleophobic property is assessed quantitatively by measurement of the angle of contact formed more often than not by a drop of water on a given substrate. If there is no further indication, this angle of contact is measured for a horizontal substrate. In reality, as already noted above, it is the behavior of drops of liquid in dynamics which is addressed by the act of imparting a hydrophoby to a substrate. This also holds

true for approximately vertical static substrates such as the exterior glazing for the building trade, glazing for showers as well as for transportation vehicles. Now, in the case of a drop of liquid on a substrate inclined in relation to the horizontal, two different angles of contact are seen: the angle of advance and the angle of retreat, determined at the front and at the rear of the drop, respectively, in relation to the direction of its travel. These angles are values attained at the limit of disengagement of the drop. The difference between the angle of advance and the angle of retreat is called hysteresis. A drop of water having a high hysteresis or a small angle of retreat likely would have difficulty in flowing on a substrate. Thus it is easily understood that an effective hydrophoby is conditioned by both a large angle of advance and a low hysteresis.

As a matter of fact, on this level the inventors obtained excellent results, never before achieved. On a hydrophobic substrate in accordance with the invention, an exceptionally smooth and rapid flow of water drops was obtained. Moreover, it has been able to be confirmed that the measures set forth in accordance with the invention also are of such nature as to intensify the hydrophilic aspect of a substrate. One of the consequences thereof is, in certain cases, according to the preceding explanations, that the anti-staining aspect attains a very high level.

These results are achieved, in accordance with the invention, by means of a substrate comprising a relief which defines a low surface level and a high surface level, separated by a certain height not less than 1/10 of the characteristic dimensions of the motif forming said high level, the latter representing 1 to 65% of the surface of the substrate.

In fact, such a substrate has proven to be capable of providing super-hydrophobic/oleophobic or super-hydrophilic/oleophilic properties, and in particular with respect to drops of water flowing thereon, a very large angle of advance for a very low hysteresis.

a) the silicones, and

$$\text{F}_3\text{C}(\text{CF}_2)_m(\text{CH}_2)_n\text{SiX}_{3-p} \quad (\text{I})$$

and

$$\dot{R}_p \quad (II)$$
$$R_p'SiX_{4-p}'$$

- m = 0 to 15;
- n = 1 to 5;
- p = 0, 1 or 2;
- R is a linear or branched alkyl group or a hydrogen atom;
- X is a hydrolyzable group such as a halogeno, alkoxy, acetoxy, acyloxy, amino, NCO group;
- p' = 0, 1, 2 or 3.

According to the second principal variant of the invention, the substrate is hydrophilic/oleophilic because it contains a suitable agent. As a hydrophilic/oleophilic agent there may be cited, as a final product or a precursor, poly(meth)acrylic acid as is or at least partially salfied with sodium, potassium, cesium..., nonionic surfactants, esters of cellulose such as hydroxypropyl cellulose, derivatives of chitosan and chitine, polymethacrylates, poly(vinyl alcohols) and poly(vinyl acetate), polypyrrole, polyaniline, poly(acrylamide), poly(N,N-dimethylacrylamide), poly(N-isopropylacrylamide), poly(ethylene glycol), poly(propylene glycol), poly(oxyethylene) with hydroxy or methoxy end functions, poly(allylamine) chlorhydrate, polysaccharide, (branched)dextrans, (linear polysaccharide)pullulan, poly(styrene carboxylic acid) and salt thereof, poly(styrene sulfonic acid), sodium poly(styrene sulfonate), poly(vinyl butyral), poly(2-vinyl-N-methyl pyridinium iodide), poly(4-vinyl-N-methyl pyridinium iodide), poly(2-vinyl pyridine), poly(2-vinyl pyridinium bromide), poly(vinyl pyrrolidone), copolymers obtained

A case in which this continuity exists in two directions of the plane of the substrate might be represented by a relief comprising a multiplicity of approximately identical cylindrical craters uniformly distributed on the substrate, their axes being approximately perpendicular to the plane of the substrate (provided that these craters are disposed over a substantial proportion of the expanse of the substrate, as previously specified).

According to a second type of form of the relief, said high surface levels displays no continuity in any direction of the plane of the substrate.

This type is represented in particular by a relief made up essentially of a discrete series of identical or different objects, in particular cylinders with axes approximately perpendicular to the plane of the substrate, notably identical cylinders of revolution uniformly distributed on the substrate.

In accordance with various embodiments of the invention, reliefs have been formed based on at least one compound of at least one of the elements: Si, W, Sb, Ti, Zr, Ta, V, Pb, Mg, Al, Mn, Co, Ni, Sn, Zn, In and/or a plastic possibly containing a filler which may be hardened by means of application of an energy source, or a thermoplastic, at least one underlying portion of the substrate being composed of a glass and/or a plastic (in particular of the type occurring in the customary composition of a glazing, which will be explained in further detail below).

According to a particularly advantageous variant of the invention, the substrate is a conductor of electricity. It then is composed, for example, of sub-stoichiometric and/or doped metal oxides such as described in the application FR 2 695 117.

Examples thereof mentioned in this application are indium oxide doped with tin (ITO), zinc oxide doped with indium (ZnO:In), with fluorine (ZnO:F), with aluminum (ZnO:Al) or with tin (ZnO:Sn) and tin oxide doped with fluorine (SnO₂:F). In addition to their electricity-conducting properties, these materials are described as displaying reflecting properties in the infrared, particularly low-emissivity, range (the case of a transparent substrate). Nonetheless, in the context of this application, the ability of the substrate to conduct electricity applies principally to the antistatic function, that is, the capacity to dissipate electrostatic charges and to prevent the accumulation thereof locally and, to a lesser extent, the formation of heating films, in particular

The substrate of the invention preferably displays anti-staining properties. These may derive in part, as has been seen above, from the (super-)hydrophobic/oleophobic or (super-)hydrophilic/oleophilic properties. These properties also may be directly linked to the nature of certain components of the substrate. Thus, among the hydrophilic/oleophilic agents

According to a fourth process, a film in itself forming said relief is caused to adhere to a support surface. This film may be plastic-, in particular thermoplastic-based.

Each of these four processes terminates:

- either in the formation of a mold which may be used to form the substrate of the invention,
- or in the formation of the substrate itself.

Considering the search for super-hydrophobic/oleophobic or for super-hydrophilic/oleophilic which gave rise to the invention, it should be specified that the hydrophobic/oleophobic or hydrophilic/oleophilic agents as a rule are applied separately according to two main well-known methods: they may be incorporated into the substrate, that is, integrated into the material of the substrate, or else deposited in the form of a coating on the relief of the substrate. According to this second method, it is known to make up hydrophobic coatings in layers or films of varying thicknesses, in particular so-called monomolecular films the thickness of which corresponds to the length of the molecules which constitute it and attains values as low as a few nanometers up to several tens of nanometers.

As the properties of hydrophoby and hydrophily act against one another, the substrate of the invention generally comprises only one or more hydrophobic/oleophobic agents and one or more hydrophilic/oleophilic agents. Nonetheless, the inventors were able to make the two types of agents coexist in one particularly advantageous embodiment in which a relief of objects made of hydrophobic material, for example with a base of perfluoroalkyl alkyltrialkoxysilane, is formed on an anti-staining Ti_2 support surface. The high surface level then is provided with a hydrophobic aspect contributing subsidiarily to the removal of dirt. In terms of the geometry of the relief, it is not ruled out that a liquid flowing on the substrate may come into contact in part with the low surface level of the relief, characterized by its dual hydrophilic and photocatalytic property. It therefore is possible, by means of an appropriate selection of relief geometry, to take advantage of the synergy of the various components of the substrate so as to promote the removal of liquids from the surface thereof and to ensure a high level of cleanliness in the absence of cleaning.

A small 3-cm x 3-cm silicon plate perfectly flat for a thickness of 0.2 cm is made hydrophobic by grafting of a single layer of fluorosilane $F_3C(CF_2)_9(CH_2)_2SiCl_3$. The angles of contact of water (angle of advance A_a and angle of retreat A_r) are measured by means of a goniometer with a precision in the region of one degree and recorded in the table hereinbelow. To accomplish this, a drop of water is formed on the surface of the small plate by means of a pipette and the angle of advance is measured during the expansion of the drop; in the second phase, the volume of the drop is reduced by gradually drawing up in the pipette the water which forms it, the angle of contact measured during this operation being the angle of retreat.

The indications "perpendicular" and "parallel" refer to the directions in which the

In comparison with the control constituted by the small flat plate, it is noted that the small plates with reliefs according to the invention in all cases attain a substantial increase in the angle of advance while retaining a hysteresis which is unchanged or changed only slightly. By way of exception, an unfavorable decrease in the angle of retreat is seen in the case of the small plate with craters; this phenomenon probably is linked to the particular geometry of this surface, and might be interpreted as the expression of a "suction" effect exerted by the craters, which might hold back the water in its flow. The fact remains that the other values obtained express an exceptionally high degree of the hydrophobic nature, clearly superior to that of the small flat plate.

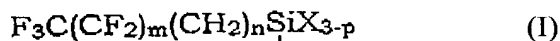
CLAIMS

1. A substrate comprising a relief which defines a low surface level and a high surface level, separated by a certain height not less than 1/10 of the characteristic dimensions of the motifs forming said high level, the latter representing 1 to 65% of the surface of the substrate.

2. A substrate according to claim 1, **characterized in that** it is hydrophobic/oleophobic by the fact that it comprises an agent chosen from among the group made up of:

a) the silicones, and

b) the compounds corresponding to the formulas:



and



- m = 0 to 15;

- n = 1 to 5;

- p = 0, 1 or 2;

- R is a linear or branched alkyl group or a hydrogen atom;

- X is a hydrolyzable group such as a halogeno, alkoxy, acetoxy, acyloxy, amino, NCO group;

- p' = 0, 1, 2 or 3.

3. A substrate according to claim 1, **characterized in that** it is hydrophilic/oleophilic.

4. A substrate according to claims 1 to 3, **characterized in that** said height ranges between 0.01 and 10 micrometers.

5. A substrate according to one of claims 1 to 4, **characterized in that** the geometry of said relief does not display any periodicity.

6. A substrate according to one of claims 1 to 4, **characterized in that** the geometry of said relief displays a periodicity.

7. A substrate according to one of claims 1 to 6, **characterized in that** said low and high surface levels are connected to one another by means of partitions approximately perpendicular to the plane of the substrate.

8. A substrate according to one of claims 1 to 7, **characterized in that** said high surface level displays a continuity in at least one direction of the plane of the substrate.

9. A substrate according to claim 8, **characterized in that** said relief comprises a multiplicity of approximately identical parallelepipedal objects, parallel and uniformly spaced.

10. A substrate according to one of claims 1 to 7, **characterized in that** said high surface level does not display continuity in any of the directions of the plane of the substrate.

11. A substrate according to one of the preceding claims, **characterized in that** said relief comprises a multiplicity of approximately identical cylindrical craters uniformly distributed on the substrate, their axes being approximately perpendicular to the plane of the substrate.

12. A substrate according to one of the preceding claims, **characterized in that** said relief comprises a discrete series of identical or different objects.

13. A substrate according to claim 12, **characterized in that** said objects consist of cylinders with axes approximately perpendicular to the plane of the substrate.

14. A substrate according to claim 13, **characterized in that** said relief comprises a multiplicity of approximately identical cylinders of revolution uniformly distributed on the substrate.

15. A substrate according to one of the preceding claims, **characterized in that** said relief is based on at least one compound of at least one of the elements: Si, W, Sb, Ti, Zr, Ta, V, Pb, Mg, Al, Mn, Co, Ni, Sn, Zn, In, and/or a plastic, possibly containing a filler, which may be hardened by means of application of an energy source, or a thermoplastic, and in that at least one underlying portion of the substrate is composed of a glass and/or a plastic.

16. A substrate according to one of the preceding claims, **characterized in that** it is a conductor of electricity.

17. A substrate according to one of the preceding claims, **characterized in that** it displays anti-reflecting properties.

18. A substrate according to one of the preceding claims, **characterized in that** it displays anti-staining properties.

19. A process for formation of a substrate comprising a relief according to one of the preceding claims, **characterized in that** it is composed of the stages consisting in:

- applying to a support surface a precursor of liquid to viscous consistency, in
- carrying out the molding of a sol-gel from this precursor, then in
- consolidating this through evaporation of solvent, possibly with the aid of an energy source.

20. A process for formation of a substrate comprising a relief according to one of claims 1 to 18, **characterized in that** it is composed of the stages consisting in:

- applying to a support surface a polymerizable and/or cross-linkable plastic possibly containing fillers, in particular mineral fillers for reinforcement, in
- performing polymerization and/or cross-linking as well as separation of possible residual components such as solvent, possibly with the aid of an energy source.

21. A process for formation of a substrate comprising a relief according to one of claims 1 to 18, **characterized in that** it is composed of the stages consisting in:

- forming a mask on a surface according to a technique such as serigraphy, ink-jet printing, lithography, in particular photolithography, engraving, for example ionic reactive, or similar,
- attacking, in particular by chemical means, the portions of said surface not protected by this mask, then possibly in
- removing the mask.

22. A process for formation of a substrate comprising a relief according to one of claims 1 to 18, **characterized in that** it includes a stage consisting in causing a film in itself forming said relief to adhere to a support surface.

31. An application of a glazing according to claim 27 for furnishings or household electrical appliances, for example as a refrigerator or other shelf, shower partition, refrigerator or oven door, display case, vitreous ceramic plate.

Abstract

The invention concerns a substrate comprising a relief which defines a low level and a high level surface, spaced apart by a certain height not less than $1/10$ th of the characteristic dimensions of the patterns forming said high level, the latter representing from 1 to 65 % of the substrate surface. The invention also concerns methods for forming such a substrate, a glazing at least partly formed with said substrate and the use of said glazing for a building, urban installations, air, sea or land transport vehicles, display screens, lamps, backlights, furniture or electrical household equipment.

WO 00/64829

OBLON ET AL (703) 413-3000

DOCKET # 21740USPC7 SHEET 1 OF 2

PCI/FK00/01051

09926367 061302

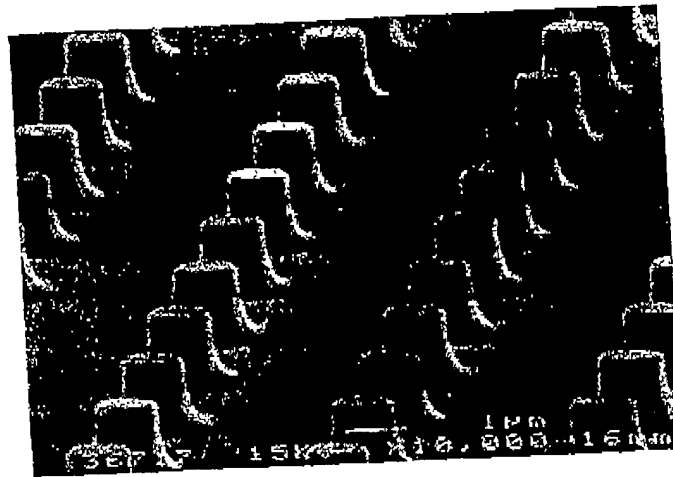


FIG. 1

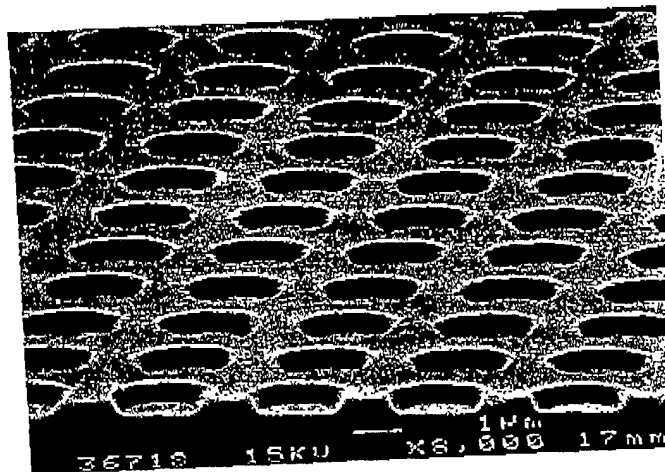


FIG. 2

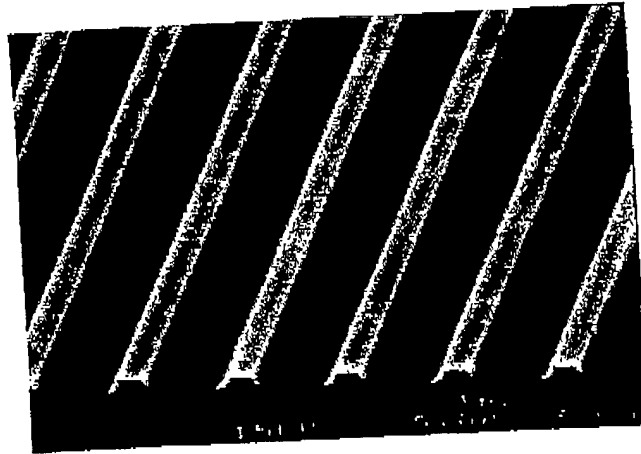


FIG. 3

PL 2 99025 Paris
09/926,367 06/23/02

215140US0PCT



Declaration and Power of Attorney for Patent Application

Déclaration et Pouvoirs pour Demande de Brevet

French Language Declaration

En tant l'inventeur nommé ci-après, je déclare par le présent acte que:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

TEXTURED SUBSTRATE CAPABLE OF FORMING A GLAZING, METHOD FOR OBTAINING SAME

et dont la description est fournie ci-joint à moins

the specification of which

- ☐ ci-joint
- ☐ a été déposée le _____

sous le numéro de demande des Etats-Unis ou le numéro de demande international PCT

_____ et modifiée le _____
_____ (le cas échéant).

- ☐ is attached hereto.
- ☒ was filed on 22 OCTOBER 2001

as United States Application Number or PCT International Application Number

09/926,367 and was amended on _____
_____ (if applicable)

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

Prior Foreign Application(s)
Demande(s) de brevet antérieure(s) dans un autre pays.

<u>99 05082</u> (Number) (Numéro)	<u>FRANCE</u> (Country) (Pays)
_____ (Number) (Numéro)	_____ (Country) (Pays)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

_____ (Application No.) (N° de demande)	_____ (Filing Date) (Date de dépôt)
---	---

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la demande antérieure et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

<u>PCT/FR00/01051</u> (Application No.) (N° de demande)	<u>20 APRIL 2000</u> (Filing Date) (Date de dépôt)
_____ (Application No.) (N° de demande)	_____ (Filing Date) (Date de dépôt)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la § 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby claim foreign priority under Title 35, United States Code, § 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

<u>22 APRIL 1999</u> (Day/Month/Year Filed) (Jour/Mois/Anné de dépôt)	Priority Claimed Droit de priorité Revendiqué <input checked="" type="checkbox"/> Yes Oui
_____ (Day/Month/Year Filed) (Jour/Mois/Anné de dépôt)	<input type="checkbox"/> No Non

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

_____ (Application No.) (N° de demande)	_____ (Filing Date) (Date de dépôt)
---	---

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

_____ (Status: Patented, Pending, Abandoned) (Statut : breveté, en cours d'examen, abandonné)	_____ (Status: Patented, Pending, Abandoned) (Statut : breveté, en cours d'examen, abandonné)
---	---

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

French Language Declaration

POUVOIRS: En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec l'Office des brevets et des marques: (*mentionner le nom et le numéro d'enregistrement*).

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)



022850

Addresser toute correspondance à:

Send Correspondence to:



022850

Addresser tout appel téléphonique à:
(nom et numéro de téléphone)

Direct Telephone calls to: (name and telephone number)

(703) 413-3000

Nom complete de l'unique ou premier inventeur	Full name of sole or first inventor
100	Christian MARZOLIN
Signature de l'inventeur	Inventor's signature
Date	Date
	✓ <i>Marzolin</i> 5/13/2002 ✓
Domicile	Residence
	10, rue Sainte-Anastase, F-75003 Paris, FRANCE FRX
Nationalité	Citizenship
	FRANCE
Adresse Postale	Mailing Address
	SAME AS ABOVE

Nom complete du second co-inventeur, le cas echeant	Full name of second joint inventor, If any
200	David QUERE
Signature de l'inventeur	Second inventor's signature
Datum	Date
	✓ <i>David Quere</i> 5/25/02 ✓
Domicile	Residence
	11, rue Ernest Cresson, F-75014 Paris, FRANCE FRX
Nationalité	Citizenship
	FRANCE
Adresse Postale	Mailing Address
	SAME AS ABOVE

(Fournir les mêmes renseignements et la signature du troisième co-inventeur et de tout co-inventeur supplémentaire.)

(Supply similar information and signature for third and subsequent joint inventors.)